

Baumann et al.
Serial No. 10/755,632
Filed: 1/12/2004

Remarks

This Amendment is submitted in response to the outstanding Office Action wherein the Examiner rejected Claims 1-17, all the claims under consideration. Reconsideration and allowance of the application in view of the amendments submitted herewith and the following remarks is respectfully requested.

By this Amendment, applicants have amended the claims in an effort to set forth their unique finstock that is formed from an aluminum alloy comprising from greater than 2.0 wt % to about 2.4 wt % Fe, wherein the finstock is substantially free of cracking and breakage. Thus, the independent claims now all recite a substantially crack free finstock, in which Fe is present in amounts ranging from greater than 2.0 to about 2.4 weight percent.

Prior to discussing the prior art rejections, applicants take this opportunity to set forth the following brief remarks about their invention. Applicants have discovered that an aluminum alloy comprised of about 0.7-1.2% Si, greater than 2.0 to about 2.4% Fe, about 0.6-1.0% Mn, up to about 0.5% Mg, up to about 2.5% Zn, up to about 0.10% Ti, and up to about 0.05% In, with the remainder comprising Al and tolerable Impurities, when cast into an aluminum alloy strip substantially free of coarse intermetallics is suitable for cold rolling into an aluminum alloy fin stock without cracking or breaking. Prior fin stock processing methods and aluminum alloy's having an Fe content within the range claimed by the applicants', such as the fin stock disclosed in U.S. Patent No.

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6,620,265 to Kawahara et al., could not be cold rolled without substantial cracking and therefore could not be utilized for a finstock. Accordingly, it is respectfully submitted that the inventive finstock and heat exchanger, as now claimed, more clearly describes the benefits obtained, which are not shown or suggested in the prior art. Thus, applicants respectfully submit that the application is in condition for immediate allowance.

Specifically, applicants have amended Claim 1 to recite a finstock comprising an aluminum alloy comprised of about 0.7-1.2% Si, greater than 2.0 to about 2.4% Fe, about 0.6-1.0% Mn, up to about 0.5% Mg, up to about 2.5% Zn, up to about 0.10% Ti, and up to about 0.05% In, with the remainder comprising Al and tolerable Impurities, wherein the aluminum alloy when cast into an alloy strip and reduced by cold rolling provides an aluminum alloy finstock that is substantially free of breakage. Applicants have made similar amendments to the fin for a heat exchanger recited in Claim 10 and the heat exchanger recited in Claim 14. Support for the amendments to Claims 1, 10 and 14 are found throughout applicants' specification. For example, referring paragraph 0041 of applicants' disclosure, applicants disclose that iron in the range from 2.0 to about 2.2 weight percent is a good compromise for balancing post-braze strength and ease of manufacture. Referring to Table 1 of applicants' disclosure, applicants disclose alloy compositions in which Fe is present in 2.1 wt % and 2.2 wt %.

Applicants have also amended Claims 1, 10, and 14 to recite that the alloy when cast into an alloy strip and reduced by cold rolling provides a finstock substantially free of cracking. Support for the amendment to Claims 1, 10 and 14 to recite that the finstock is

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substantially free of cracking is found in paragraphs 0051 to 0053 of applicants' disclosure.

Turning now to the Office Action, the Examiner rejected Claims 1-17 under 35 U.S.C. 102(e) as allegedly anticipated by or, in the alternative 35 U.S.C. §103(a), as allegedly obvious over U.S. Patent No. 6,620,265 to Kawahara et al. ("Kawahara et al."). Applicants respectfully traverse for the following reasons.

It is axiomatic that anticipation under §102 requires the prior art reference to disclose every element to which it is applied. *In re King*, 801 F.2d 1324, 1326, 231 USPQ 36, 138 (Fed Cir, 1986). Thus, there must be no differences between the subject matter of the claim and the disclosure of the prior art reference. Stated another way, the reference must contain within its four corners adequate direction to practice the invention as claimed. The corollary of the rule is equally applicable: absence from the applied reference of any claimed element negates anticipation. *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

Kawahara et al. fail to anticipate applicants' invention, since Kawahara et al. fail to disclose each and every element of applicants' claimed finstock or heat exchanger. Specifically, Kawahara et al. fail to disclose a substantially crack free finstock that is formed of an aluminum alloy comprising Fe present in greater than 2.0 wt % and less than 2.4 wt %, as recited in amended Claims 1, 10 and 14.

As discussed above, applicants' have discovered that the claimed alloy comprising greater than 2.0 to less than 2.4 wt % Fe when cast into an alloy strip and cold rolled

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provides an aluminum alloy fin stock substantially free of cracking or breakage. Referring to Paragraph 0051 of applicants' disclosure, applicants disclose that the claimed composition is suitable for aluminum fin stock when cast in a manner as to produce an alloy strip substantially without coarse intermetallics, such as primary Fe-bearing intermetallics, and without heavy bands of eutectic segregation in the form of centerline segregation. One example of a casting method that may be used in conjunction with the claimed composition is described in paragraphs 0061 to 0069 of applicants' disclosure. Referring to paragraph 0052 of applicants' disclosure, applicants further noted that the processing disclosed in Kawahara et al. results in the formation of coarse intermetallics in the form of primary Fe-bearing particles and therefore could not produce a finstock substantially free of cracking when having an iron content greater than 2.0 wt %.

Turning to Page 2 of the Office Action, it is the Examiner's position that comparative example "M" disclosed in Table 1 of the Kawahara et al. reference meets the limitation of applicants' claimed aluminum finstock alloy. The Examiner refers to comparative example "M" as one non-preferred embodiment disclosed in Kawahara et al. of an Al-Fe-Si-Mn used for finstock, which includes 0.9 wt % Mn, 2.2 wt % Fe, and 0.9 wt % Si. Applicants respectfully disagree and submit the following.

Referring to Column 3, lines 16-18, of the Kawahara et al. reference, Kawahara et al. disclose that in order to provide an aluminum fin stock using the method disclosed therein, the Fe content must be maintained to less than 2.0 wt %. Referring to Column 3,

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lines 27-32, Kawahara et al. disclose that "a Fe content of 1.3% by mass or more is preferred for enhancing the mechanical strength, while a Fe content of 1.8% by mass or less is preferable for decreasing the content of Fe in the intermetallic compound." There is no teaching throughout the Kawahara et al. disclosure that an aluminum alloy including applicants' claimed Fe content (greater than 2.0 wt %) would provide an aluminum finstock without resulting in breakage or cracking.

Applicants note that comparative example "M", as relied upon by the Examiner, is an example of how the alloy and method disclosed in Kawahara et al. can not contain greater than 2.0 wt % Fe and provide a suitable alloy for producing crack free aluminum finstock. Specifically, with reference to Experiment No. 24 in Tables 4 and 6 of the Kawahara et al. disclosure, it is noted that comparative example M results in breakage of the metal strip during the cold rolling step. Referring to Column 29, lines 55-62, Kawahara et al. further disclose that "in experiment No. 24, since the Fe content was too large to cause crystallization of the Fe compound as the primary crystallization, thereby the fin material was broken during the cast rolling and cold rolling steps, and the resultant fin was broken during the core assembly step." Therefore, example M of Table 1 fails to teach or suggest an aluminum alloy that can be cold rolled into a finstock substantially free of cracking or breakage. Applicants submit that there is no disclosure of an aluminum alloy containing greater than 2.0 wt % Fe that provides a finstock substantially free of cracking or breaking throughout the entire Kawahara et al. reference. Therefore, since Kawahara et al. fail to provide a crack free finstock comprising greater than 2.0 wt

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% Fe, Kawahara et al. fail to teach each and every limitation of applications claimed invention, as recited in amended Claims 1, 10 and 14.

The forgoing remarks clearly demonstrate that the applied reference does not teach each and every aspect of the claimed invention as required by *King* and *Kloster Speedsteel; et. al.*, therefore the claims of the present application are not anticipated by the disclosure of Kawahara et al. Applicants respectfully submit that the instant §102 rejections has been obviated and withdrawal thereof is respectfully requested.

Turning now to the §103 rejection of Claims 1-17, applicants submit that Kawahara et al. fail to render applicants' invention obvious for the same reason Kawahara et al. fail to anticipate applicants' invention. Kawahara et al. fail to teach or suggest each and every limitation of applicants' claimed invention, as recited in amended Claims 1, 10 and 14. "To establish a prima facie case of obviousness of a claimed invention all the claimed limitations must be taught or suggested by the prior art". *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 44, 496 (CCPA 1970). Specifically, as discussed above with respect to the §102 rejections, Kawahara et al. fail to teach or suggest a crack free finstock formed of an Al-Fe-Si-Mn alloy containing greater than 2.0 wt % Fe, as recited in amended Claims 1, 10 and 14. Therefore, since Kawahara et al. fail to teach or suggest each and every limitation of applicants' claimed finstock, Kawahara et al. fail to render Claims 1-17 unpatentable.

The §103 rejection also fails because there is no motivation in Kawahara et al. that suggests modifying the methods and alloys disclosed therein to provide

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applicants' claimed finstock, which includes the features recited in amended Claims 1, 10 and 14. The rejections are thus improper since the prior art does not suggest this drastic modification. The law requires that a prior art reference provide some teaching, suggestion, or motivation to make the modification obvious.

Here, there is no motivation provided in the disclosures of the applied prior art reference, or otherwise of record, which would lead one skilled in the art to modify the alloy of the Kawahara et al. to include greater than 2.0 wt % Fe. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Fritch, 972 F.2d, 1260,1266, 23 USPQ 1780,1783-84 (Fed. Cir. 1992).

Applicants further submit that one skilled in the art would not modify the Kawahara et al. disclosure to meet the limitations of applicants' invention, since Kawahara et al. teach away from applicants' claimed Fe content. It is improper to modify references where the reference teaches away from the proposed modification. *See In re Graselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983). Kawahara et al. disclose that AlFeMnSi compositions including greater than 2.0 wt % Fe break during cold rolling and therefore would not be suitable for finstock applications. *See Column 29, lines 55-62 of the Kawahara et al. reference.* Therefore, since Kawahara et al. disclose that Fe concentrations greater than 2.0 wt % results in breakage during cold rolling, one having ordinary skill in the art would not modify the alloy composition

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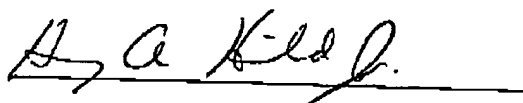
disclosed in Kawahara et al. to include greater than 2.0 wt % Fe for finstock applications, as claimed by the applicants.

There is no suggestion in the prior art of applicants' structure therefore all the claims of the present application are not obvious from the combined prior art references cited in the present Office Action.

Based on the above amendments and remarks, the §103 rejection citing Kawahara et al. has been obviated; therefore reconsideration and withdrawal of the instant rejections are respectfully requested.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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